

Far-IR, Sub-mm & MM Detector Technology Workshop

Location: Monterey CA; Date: 1st- 3rd April 2002; Duration: 2 days (3 nights)

Purpose of workshop

Most of the radiation in the Universe is emitted at wavelengths longer than 30 microns. These wavelengths highlight the birth and evolution of most of the normal objects in our Universe: they highlight cool to warm phenomena, processes of change such as formation of planetary systems, star formation, galaxy evolution and the Cosmic Microwave Background. Yet, precisely in this wavelength range where the Universe is most luminous, detector development is not mature and is under-funded. This is because the development of such detectors falls completely on the shoulders of the astronomical community. Private industry and military development efforts are at a very low level at best.

Far-IR, sub-mm & mm detector demand for this decade: SIRTf (2002 – 2007), SOFIA (2004 –2024), Planck/HFI (2007 – 2010) and Herschel (2007 – 2010) are four observatories that will observe the Universe at these important wavelengths (3 μm – 3 mm). The latter three will fly detectors yet to be fully developed and/or tested. Existing and planned ground-based sub-mm and mm (300 μm – 3 mm) observatories would increase their productivity and capabilities many times by improved large-format detector arrays, and such observatories provide a natural testing ground, as does SOFIA, for technologies that ultimately are essential for future NASA space-based missions.

Beyond 2010: In the last Decadal Report issued by the National Academy of Science, in regards to Astronomy and Astrophysics, major new initiatives were recommended for study and development during this decade for operations in the next. One such mission is the SAFIR (Single Aperture Far Infrared) Observatory, an 8 m class space-based telescope exploring the Universe from 30 to 300 microns. “It will enable the study of galaxy formation and the earliest stage of star formation by revealing regions too enshrouded by dust to be studied by NGST, and too warm to be studied effectively with ALMA.”

NASA Headquarters has recently commissioned an IR / Sub-mm Detector Working Group to investigate the issues facing IR/Sub-mm detector development. This group is to put their findings and recommendations into a report to be delivered to NASA by mid-May 2002.

The Far-IR, Sub-mm & MM Detector Technology Workshop will provide a forum for the community of observers, instrument developers, detector developers, and the NASA IR Detector Working Group to discuss detector technology and development issues for wavelengths longer than 30 microns. The workshop would specifically:

- (1) Review present and future Far-IR, Sub-mm, and mm missions/science;**
- (2) Outline the new technologies being explored by detector developers and their projections of the state-of-the-art technologies beyond 2010;**
- (3) Outline the available infrastructure and needed new infrastructure required to develop and characterize new detector arrays and their electronics to supply foreseen science instrument/mission developments;**
- (4) Identify possible future involvement by industry in detector development for wavelengths longer than 30 microns;**
- (5) Provide input to the NASA IR/ Sub-mm Detector Working Group; and**
- (6) Produce a proceedings that will be a useful reference document for the community.**